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Analysis the Drivers of Environmental Responsibility of Chinese Auto Manufacturing Industry Based on Triple Bottom Line

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Abstract: The rapid increasing number of automobile products has brought great convenience to people's living, but it has also caused serious environmental issues, waste of resources and energy shortage during its whole lifecycle. Corporate Environmental Responsibility (CER) refers to the company's responsibility to avoid damage to the natural environment derived from its corporate social responsibility (CSR), and it plays an important role in solving resource and environmental problems. However, due to various internal and external reasons, it is difficult for the automobile manufacturing industry to find the key drivers for the implementation of CER. This research proposes a model framework that uses the fuzzy decision-making test and evaluation laboratory (fuzzy DEMATEL) method to analyze the drivers of CER from the perspective of the triple bottom line (TBL) of economy, environment and society. Firstly, the common drivers of CER are collected using literature review and questionnaire survey methods. Secondly, the key drivers are analyzed by using the fuzzy DEMATEL. Finally, the proposed approach was verified through a case study. The research results show that some effective measures to implement CER can be provided for the government, the automobile manufacturing industry and the public to promote sustainable development of Chinese Auto Manufacturing Industry (CAMI).

Keywords: Chinese automobile manufacturing industry; corporate environmental responsibility; fuzzy DEMATEL; triple bottom line; sustainable development; green manufacturing

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1. Introduction

According to relevant survey reports, the number of Chinese new automobiles almost exceeded 25.76 million, and the amount of Chinese vehicle ownership reached more than 260 million up to 2019. The rapid growth of the number of automobiles has brought a series of environmental issues. In the process of automobile production, use, recycling and disposal, air, soil, water, etc., will be polluted to a certain extent, resulting in waste of resources and energy shortage [1]. These environmental issues have aroused widespread concern from the government, enterprises and scholars. While the Chinese government is strengthening environmental supervision of the automotive industry, the extension of the production responsibility and Corporate Environmental Responsibility (CER) have become hot topics of concern to many automotive industry units. Therefore, many Chinese auto companies are aware of the importance of sustainable development, and have implemented some sustainable development strategies, such as CER, remanufacturing, green manufacturing and cleaner production [2–6].

In fact, due to various reasons, it is difficult for them to effectively implement sustainable development strategies, especially CER. The main reason is that some automobile companies are worried that the implementation of CER may affect their financial interests, so they are unwilling to implement CER. In addition, some companies voluntarily implement CER, but they do not know what measures should be taken. Therefore, by analyzing the drivers of CER, the fundamental reason why enterprises cannot effectively implement CER can be found, thereby promoting the change of development strategy of Chinese Auto Manufacturing Industry (CAMI) and achieving coordinated development of economic and environmental benefits.

At present, some studies focus on the combination of CER and sustainable practices, such as integrating CER into the supply chain, and the combination of sustainable development and CER. As many automobile companies pay more attention to economic interests, compared with well-known foreign automobile companies, the efficiency of CER implementation by Chinese automobile manufacturers is relatively low. So far, only a few studies have focused on the drivers of CER for Chinese automobile manufacturers and revealed the internal connection between the corporate environmental responsibility and the corporate economic benefits. The "Triple Bottom Line" was proposed by John Elkington [7], a well-known British management consultant and sustainability expert, and used it to measure his company's performance in the United States. Triple Bottom Line (TBL) theory believes that there should be three bottom lines: profit, people and the earth. TBL aims to assess the level of corporate commitment to social responsibility and its impact on the environment over time. Additionally, CER is concerned about the impact of the development of the enterprise on the environment. There is a close relationship between TBL and CER. The influencing factors of enterprises implementing CER can be analyzed from the perspective of TBL. The purpose of both is to achieve a balanced development of economic and environmental benefits. Therefore, this study attempts to identify and analyze the CER drivers of Chinese automakers from the perspective of TBL to bridge the gap. In this study, first, based on a comprehensive analysis of the existing literature, expert opinions and the opinions of Chinese auto industry managers, common drivers were identified. Second, we sent questionnaires to some automobile companies. Third, based on the results of the questionnaire survey, a quantitative and the fuzzy decision-making test and evaluation laboratory (fuzzy DEMATEL) analysis was used to determine the key drivers and classifications.

The rest of this paper is arranged as follows: Section 2 reports a literature review related to the research topic and proposes the main innovations of this paper based on comparative analysis. Section 3 describes the problem. Section 4 introduces the method used in this research, namely fuzzy DEMATEL, and proposes a model framework for analyzing the CER drivers of the Chinese automobile industry. Section 5 verifies the proposed model through case studies. Section 6 discusses in detail. Finally, Section 7 gives conclusions and future work.

2. Literature Review

2.1. Corporate Environmental Responsibility and Triple Bottom Line

CER, called corporate environmental responsibility, refers to a company's duties to abstain from damaging natural environments, which derives from corporate social responsibility (CSR) [8]. In recent years, CER has become an important concept and has received extensive attention from relevant researchers. This is because the implementation of CER can enhance the sustainable development ability of enterprises, improve the natural environment, and solve various social and ecological problems such as climate change and biodiversity loss [9,10]. Gunningham [11] described the development of the concept of CER and studied the debate about the relationship between CER and competitive advantage. On the basis of Carroll's CSR pyramid model, Wang Hong [12] explored the system characteristics of CER and sorted out its elements, structure and functions. Studies have shown that the implementation of CER can promote the green and sustainable development of manufacturing to a certain extent [13], and the improvement of the company's market competitiveness and profitability can be tracked through the implementation of environmental management activities [14]. The results of the study were verified by listed company A [15,16], which showed that the performance of corporate environmental responsibility (CER) by company A has a significant positive impact on the company's financial performance, but it has a lag effect, and higher environmental investment can bring higher profitability. Furthermore, many firms are discovering that there is an advantage to advocating for environmental regulations and preparing for them to be implemented before they become law. In a recent study, the researcher found that firms support climate change legislation as a means of gaining power over their competitors. Essentially, even if a new regulation hurts a firm in the short term, the firm may embrace it because they know that it will hurt their competitors even more. This allows them to come out on top in the long run [17].

The TBL proposed by Elkington [7] is an accounting framework that includes three aspects: economic (profit), social (people), and environmental (planet). It is used by many researchers to solve various problems [18,19]. The TBL considers profit using traditional measures for evaluating company profits, evaluating the company's environmental responsibility, evaluating the company's sustainability pillars [20,21], and citizens' concerns about corporate social responsibility as indicated by the company's operations [22,23]. Ahi and Searcy [24] claim that sustainability is the ability to maintain long-term welfare responsibly, manage resources so that the company can meet current needs without compromising the ability of future generations to meet their own needs. The TBL has been widely applied in many domains to promote sustainable development that also provides a co-benefit. Wu et al. [25] suggested that firms should consider stakeholders, resilience, long-term goals and current operations when evaluating sustainability strategies. Previous research also emphasized that TBL is not sufficient to achieve complete sustainability, and we must take greater steps to discuss socioeconomics, social environment and ecological efficiency [26,27]. Moreover, several studies noted that relations, resource consumption and policies must be integrated with sustainable practices to ensure the cobenefit [28].

Many scholars have conducted case studies from the perspective of TBL. Bergenwall [29] studied the differences in process design between American automakers and Toyota on the three aspects of sustainability. Gimenez [30] studied the impact of TBL on sustainable management. They proposed that the internal environmental plan has a positive impact on the three components of TBL, while internal social activities only have a positive impact on the two components of social and environmental performance. Neri et al. [31] designed a triple bottom line balanced key performance indicator set to measure the sustainability performance of industrial supply chains. Agrawal et al. [32] discussed the deployment decisions of sustainable reverse logistics in the Indian electronics industry, and studied the impact of disposal decisions on TBL, that is, the economic, environmental and social performance of reverse logistics. Hussain et al. [33] studied the relationship between corporate governance and triple bottom line sustainability performance through the perspectives of agency theory and stakeholder theory.

2.2. Drivers of CER in the Automotive Industry

The rapid growth of automobile ownership has caused a series of problems, such as climate change, emissions, pollution, etc. [34]. For CAMI, the factors that promote the effective implementation of CER through some sustainable development practices (such as CER, green manufacturing, sustainable supply chain management, manufacturer extension responsibility, life cycle analysis, and environmental certification, etc.) are called drivers. Therefore, many researchers have paid attention to the CER problem and conducted some extended studies.

Some studies discuss the relationship and importance of TBL principles and strategic decisions from the perspective of sustainable supply chains in the automotive industry. The successful implementation of sustainable supply chains can promote the implementation of CER [35–37]. Other studies illustrate the important indicators of CER implementation from the perspective of the green evaluation system of the automobile manufacturing industry [38]. There are also some studies that mainly elaborated the relationship between the implementation of CER and legislation from the aspect of government legislation. Studies have shown that government legislation is the most critical driver for the implementation of CER [39,40]. There are also other explorations of the relationship between energy certification, changes in corporate management strategies and the implementation of CER, including Cai et al. [41], which explored energy performance certification in the machinery manufacturing industry, and provided information for the implementation of energy performance certification strategies. The theoretical foundation is thus promoted to promote the active implementation of CER by automakers. Nunes [42] focuses on investigating and benchmarking the green operating plans of the automotive industry as documented in the environmental reports of selected companies. Research by Yu Cheng et al. [43] shows that Chinese automakers still have much room for improvement in terms of consumer satisfaction, resource conservation, community services and low-carbon activities. Kehbila et al. [40] systematically analyzed the motivations, obstacles and benefits of South African automobile companies participating in environmental change and provided some suggestions that may promote the effective implementation of strategic corporate environmental management. The research results show that achieving consistent compliance, reducing the daily impact on the environment, improving the working and living conditions of employees, and improving image and reputation are the most important driving forces. Babiak and Trendafilova [44] studied the motivations and pressures reported by senior managers to adopt sustainable practices in the industry. The research results show that strategic motivation and institutional pressure are the main reasons for adopting environmental management measures. Lee et al. [45] studied the driving forces for the implementation of CER and green practices in the Korean logistics industry, and pointed out that social expectations, organizational support and stakeholder pressure are important driving forces for the implementation of CER and green practices. Goli et al. [46] explained that corporate environmental responsibility (CER) involves key solutions for the success of corporate innovation.

By reviewing the existing literature, we know that domestic and foreign scholars have conducted CER research from different aspects. Based on the TBL method, some studies have been conducted on the sustainable development of the automotive industry, but mainly focus on the TBL analysis of the automotive industry supply chain order optimization, supply chain management or supplier sustainability. However, there are few studies on the implementation of CER in CAMI. From the perspective of TBL, there are fewer drivers for CER in automobile companies. This has led to companies not paying attention to the implementation of CER, and the effect of CER implementation is poor and difficult.

Therefore, this paper aims to analyze the key drivers of CAMI's implementation of CER from the perspective of TBL, and then analyze the promotion effect of key drivers on economy, environment and society, so as to improve the effect of CER implementation, and realize the coordination and sustainability development of economic and environmental benefits.

3. Identify Common Drivers of CER

As environmental problems have become more prominent, the public's awareness of environmental protection has continued to increase. When consumers buy automobiles, green features have become one of their important choices [47,48]. Some automakers realize that they should implement CER throughout the product life cycle to minimize the negative impact on the environment to meet consumer's demand for environmentally friendly products [49]. However, they do not know how to effectively implement CER to promote the sustainable development and green development of enterprises, and the implementation of CER in CAMI has always been controversial, so there is an urgent need to improve the effectiveness of CER implementation.

Therefore, this paper analyzes the drivers of CER in CAMI from the perspective of TBL (economic, social and environmental). Based on relevant literature, expert opinions and the opinions of Chinese auto industry managers, we jointly determine the common drivers for CER in China's auto industry. First, we collect CER drivers from relevant literature, and use "corporate environmental responsibility", "corporate environmental responsibility drivers" and "Chinese automobile manufacturer environmental responsibility" as search keywords. Secondly, we inquired about the main motivations for Chinese automakers to implement CER in 120 Chinese auto industry units through e-mail and telephone. We finally received replies from 82 Chinese auto companies. Third, on the basis of the above process of determining common drivers, we held an online seminar, inviting CAMI experts and managers to participate in order to solve these classifications. After discussion, we got the final result on the classification of common drivers. Through the above process, the common CER drivers in CAMI were identified and classified, as shown in Table 1. The main drivers identified include policy drivers, technology drivers, corporate internal motivations and corporate external pressure. Finally, a case verification was carried out through a Chinese automobile manufacturer.

Table 1. Common drivers of corporate environment responsibility.

No.	Main Driers	Explanation	Common Drivers
1	Policy drivers	Policy drivers can be categorized into two areas, namely compulsory aspect (regulations, standards, etc.) and incentive aspect.	Incentives (A1) Government regulations (A2) Standards (A3)
2	Technological drivers	Technological drivers can help corporate achieve the sustainable development.	Green technology import (A4) Green technology innovation (A5)
3	Corporate internal motivations	These motivations mainly focus on company level, such as its own development and the demand of company's internal staff, etc.	Top management commitment (A6) Employee demand (A7) Financial benefits (A8) Shareholders motivation (A9) Company image (A10) Competitive advantage (A11)
4	Corporate external pressure	Companies need to do things that they are unwilling to do but must do to meet the needs of the public.	Consumers demand (A12) Green supply chain pressure (A13) Societal expectation (A14) Media pressure (A15) Market trend (A16)

4. The Fuzzy DEMATEL Method of Key Drivers

The proposed model framework for analyzing the drivers of CER in China's automobile industry is shown in Figure 1. First of all, with the help of existing literature, expert opinions and industry managers' opinions, most of the drivers were collected. Second, a questionnaire containing the drivers of the five-point Likert scale was distributed to Chinese automobile companies. For the collected valid questionnaires, we averaged the survey results, discussed with experts, and finally identified and classified 16 common driving factors. Then, based on the TBL, a fuzzy direct relationship matrix was established, and the key drivers of CER in CAMI were analyzed using the DEMATEL program. Finally, the results were verified in a medium-sized automobile company through feedback from the automotive industry managers and comparison with existing literature.

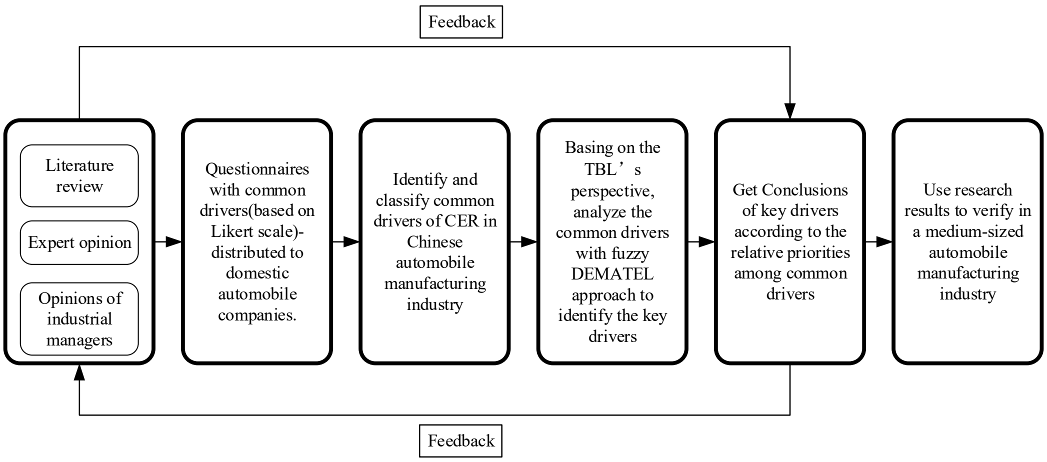

Figure 1. The model framework for analyzing the drivers of CER in Chinese auto industry.

Since the drivers for the implementation of environmental responsibility in CAMI is a complex decision-making problem, it is a common method to use multicriteria decision-making (MCDM) [50,51] method or fuzzy analytic hierarchy process [52] to make decisions. DEMATEL, as one of the MCDM approaches, firstly used by The Battelle Memorial Institute at its Geneva Research Centre in 1973, is utilized as a solution method in this paper [53]. The DEMATEL method can visualize complex causal structures by establishing and analyzing structural models between complex factors. Furthermore, it can analyze the influence relationship between complex criteria and separate the factors into cause group and effect group in which the cause group affects the effect group thus reckoning the relative weights of criteria. In this paper, since the interaction between all the drivers of CER in CAMI is relatively complex, it is necessary to use DEMATEL to help us better understand the interaction between drivers.

Although DEMATEL is a good way to deal with complex decision-making problems, the degree of mutual influence between systems is usually ambiguous, which will make language information unsuitable for expression. In order to reduce uncertainty and increase accuracy, DEMATEL is combined with fuzzy logic proposed by Zadeh [54]. It is rather effective to measure the ambiguous concepts related to human's subjective judgments with fuzzy logic [55]. Therefore, this paper uses fuzzy DEMATEL with triangular fuzzy numbers to evaluate the driving factors of CER in CAMI.

A triangular fuzzy number can be defined as a triplet $\widetilde{A} = (l, m, u)$, where l, m and u denote lower, medium, and upper numbers, respectively, to describe a fuzzy event. Additionally, the membership function $\mu_{\widetilde{A}}$ of a triangular fuzzy number can be expressed as follows:

$$\mu_{\widetilde{A}}(x) = \begin{cases} 0 & x < l \\ \frac{(x-l)}{(m-l)} & l \leq x \leq m \\ \frac{(u-x)}{(u-m)} & m \leq x \leq u \\ 0 & x > u \end{cases} \tag{1}$$

where l, m and u are real numbers and $l \leq m \leq u$.

In view of above, the model of triangular fuzzy numbers is shown in Figure 2. The correspondence between the linguistic terms and triangular fuzzy numbers can be determined by Table 2. For any of two triangular fuzzy numbers $\widetilde{A} = (l_1, m_1, u_1)$ and $\widetilde{B} = (l_2, m_2, u_2)$, the operational laws of the two triangular numbers are as shown below:

$$
\begin{cases}
\widetilde{A}_1 + \widetilde{A}_2 = (l_1 + l_2, m_1 + m_2, u_1 + u_2) \\
\widetilde{A}_1 - \widetilde{A}_2 = (l_1 - l_2, m_1 - m_2, u_1 - u_2) \\
\widetilde{A}_1 \times \widetilde{A}_2 = (l_1 \times l_2, m_1 \times m_2, u_1 \times u_2) \\
\widetilde{A}_1 \div \widetilde{A}_2 = (l_1 \div l_2, m_1 \div m_2, u_1 \div u_2) \\
\lambda \widetilde{A}_1 = (\lambda l_1, \lambda m_1, \lambda u_1), (k > 0) \\
\frac{\widetilde{A}}{\lambda} = (\frac{l_1}{\lambda}, \frac{m_1}{\lambda}, \frac{u_1}{\lambda}), (k > 0)
\end{cases}
\tag{2}
$$

where l_1, m_1 and u_1 are real numbers and $l_1 \leq m_1 \leq u_1$.

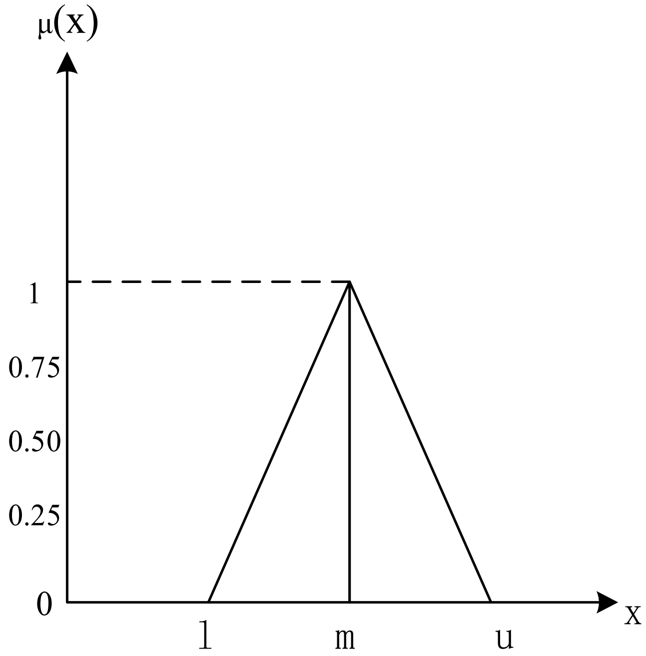

Figure 2. Triangular fuzzy number.

Table 2. Correspondence between the linguistic terms and triangular fuzzy numbers.

Linguistic Terms	Triangular Fuzzy Numbers
No influence (N)	(0,0,0.25)
Very low influence (VL)	(0,0.25,0.5)
Low influence (L)	(0.25,0.5,0.75)
High influence (H)	(0.5,0.75,1)
Very high influence (VH)	(0.75,1,1)

This section is not mandatory but may be added if there are patents resulting from the work reported in this manuscript.

The main steps of the fuzzy DEMATEL method are briefly described as follows:

Step 1: Establish the fuzzy direct relation matrix T with fuzzy linguistic terms.

Step 2: Defuzzified-Initial relation matrix F. In this step, the fuzzy direct relation matrix T is defuzzified, namely the triangular fuzzy numbers are converted to crisp numbers by centroid method, a kind of defuzzification approach. Correspondingly, the Defuzzified-Initial relation matrix F can be established by Equation (3).

$$
F_g(x) = \frac{\sum_{i=1}^{n} x_i \mu_{\widetilde{A}}(x_i)}{\sum_{i=1}^{n} \mu_{\widetilde{A}}(x_i)} \tag{3}
$$

Step 3: Establish the normalized direct-relation matrix X. In this step, the initial direct-relation matrix F is normalized by utilizing Equations (4) and (5). Consequently, the normalized direct-relation matrix X can be obtained.

$$K = \frac{1}{\max_{1 \le i \le n} \sum_{j=1}^{n} a_{ij}} \tag{4}$$

$$X = K \times F \tag{5}$$

Step 4: Establish the total relation matrix M. In this step, the total relation matrix M is calculated through Equation (6) where I denotes identity matrix. The element m_{ij} denotes the indirect effects that criterion i have on criterion j, and the matrix M gives the total relationship among the each pair of factors.

$$M = X(I - X)^{-1} \tag{6}$$

Step 5: Get the sum of rows and columns. In this step, the sum of rows and columns of matrix M are calculated through Equations (7) and (8). In the two equations, r_i denotes all direct and indirect influence given by criterion i to all other factors, c_j denotes the degree of influenced impact.

$$r_i = \sum_{1 \le j \le n} t_{ij} \tag{7}$$

$$c_j = \sum_{1 \le i \le n} t_{ij} \tag{8}$$

When $i = j$, $(r_i + c_j)$ denotes all effects that are given and received by criterion i. $(r_i + c_j)$ can show the degree of importance that criterion i, in the total system, namely the centrality of the element i in the problem group. Meanwhile, $(r_i - c_j)$ represents the net effect that criterion i has on the system. If $(r_i - c_j) > 0$, the element i will be classified into cause group. By contrast, if $(r_i - c_j) < 0$, it will be classified into effect group.

Step 6: Establish the cause–effect relation diagram. In the final step, the cause and effect relationship diagram is depicted according to the dataset of $(r_i - c_j)$. The horizontal axis (R + C) is obtained by adding R to C, and the vertical axis (R − C) is obtained by subtracting C from R.

Step 7: According to the results of the step 6, the cause group of the key drivers are ranked again to determine the most critical drivers. The calculation formula is:

$$R_g = \frac{(r_i - c_j)}{(r_i - c_j)_{\max}} \times 100\% \tag{9}$$

5. Case Study: An Explanation

5.1. Case Background

Due to the expanding trend of economic globalization, as well as the continuous development of smart and green technologies, CAMI must be able to respond to the market in a timely manner while taking into account economic growth, environmental protection, and the realization of social expectations. K Company is a medium-scale automobile manufacturing company in China, which has been committed to manufacturing energy-saving and environmentally friendly vehicles. However, the automobile company found that the effect of implementing CER on energy conservation and emission reduction is far behind that of well-known foreign automobile manufacturing companies. Therefore, the company realized the need to evaluate the drivers of CER to ensure the effective implementation of its CER. The main research goals of the automobile company are as follows: (1) The automobile company hopes to understand the common drivers and key drivers of CER. (2) The company hopes to understand the comprehensive impact of implementing CER on economic, environmental and social benefits. (3) Last but not least, automobile companies hope to achieve their own green development and sustainable development by effectively implementing CER throughout the entire life cycle of the car.

5.2. Results and Analysis

According to the results of the questionnaire, a fuzzy direct relationship matrix T in the form of fuzzy linguistic terms can be established. The fuzzy direct relationship matrix T is shown in Table 3. Using the centroid method, the fuzzy direct relationship matrix T is defuzzified into clear numbers, and transformed into the initial matrix F (Table 4), and the normalized direct relationship matrix X (Table 5) is established according to F, and then the total relationship matrix M is established (Table 6), and the row sum and column sum of the total relationship matrix M are calculated. Finally, a causality diagram is established, the results of (R + C) and (R − C) (Table 7) are calculated and used as the horizontal and vertical axes of the causality diagram, as shown in Figure 3.

Table 3. The fuzzy direct matrix T—the TBL's perspective.

Criteria	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
A1	N	VL	VL	H	H	H	N	H	H	N	N	N	VL	N	VL	H
A2	L	N	VH	L	L	H	N	L	L	N	N	VL	H	N	H	L
A3	VL	H	N	VL	VL	VL	H	L	L	N	L	L	H	L	H	L
A4	L	L	VL	N	H	H	H	L	VL	H	H	L	H	VL	VL	H
A5	H	L	L	VH	N	H	VH	VH	H	H	VH	L	L	H	L	H
A6	L	VL	VL	H	H	N	H	VL	H	H	VL	VL	L	L	VL	VL
A7	N	N	VL	L	N	H	N	VL	L	VL	N	N	VL	N	VL	N
A8	VL	VL	L	H	VH	H	H	N	VH	H	L	VL	H	N	N	L
A9	VL	VL	N	H	H	H	L	VL	N	N	L	VL	VL	H	N	VL
A10	N	N	VL	VL	VL	H	L	H	N	N	H	L	N	H	H	N
A11	N	N	VL	L	H	H	N	VH	H	H	N	H	VL	N	N	H
A12	N	VL	H	H	VH	H	N	H	H	VL	L	N	VH	L	VL	VH
A13	VL	VL	H	H	H	VL	L	L	L	N	L	H	N	H	H	H
A14	N	N	VL	VL	H	L	N	N	VL	VL	N	H	L	N	H	H
A15	VL	N	L	L	L	L	L	N	N	VL	N	H	VL	H	N	VL
A16	L	VL	VL	H	H	L	N	H	H	N	VL	H	H	H	L	N

Table 4. Initial relation matrix F—the TBL's perspective.

Criteria	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
A1	0.082	0.25	0.25	0.75	0.75	0.5	0.082	0.75	0.75	0.082	0.082	0.082	0.25	0.082	0.25	0.75
A2	0.5	0.082	0.928	0.5	0.5	0.75	0.082	0.5	0.5	0.082	0.082	0.25	0.75	0.082	0.75	0.5
A3	0.25	0.75	0.082	0.25	0.25	0.25	0.75	0.5	0.5	0.082	0.5	0.5	0.75	0.5	0.75	0.5
A4	0.5	0.5	0.25	0.082	0.75	0.75	0.25	0.5	0.25	0.75	0.75	0.5	0.75	0.25	0.25	0.75
A5	0.75	0.5	0.5	0.918	0.082	0.75	0.928	0.928	0.75	0.75	0.928	0.5	0.5	0.75	0.5	0.75
A6	0.5	0.25	0.25	0.75	0.75	0.082	0.75	0.25	0.75	0.75	0.25	0.25	0.5	0.5	0.25	0.25
A7	0.082	0.082	0.25	0.5	0.082	0.75	0.082	0.25	0.5	0.25	0.082	0.082	0.25	0.082	0.25	0.082
A8	0.25	0.25	0.5	0.75	0.928	0.75	0.75	0.082	0.928	0.75	0.5	0.25	0.75	0.082	0.082	0.5
A9	0.25	0.25	0.082	0.75	0.75	0.75	0.5	0.25	0.082	0.082	0.5	0.25	0.25	0.75	0.082	0.25
A10	0.082	0.082	0.25	0.25	0.25	0.75	0.5	0.75	0.082	0.082	0.75	0.5	0.082	0.75	0.75	0.082
A11	0.082	0.082	0.25	0.5	0.75	0.75	0.082	0.928	0.75	0.75	0.082	0.75	0.25	0.082	0.082	0.75
A12	0.082	0.25	0.75	0.75	0.928	0.75	0.082	0.75	0.75	0.25	0.5	0.082	0.928	0.5	0.25	0.928
A13	0.25	0.25	0.75	0.75	0.75	0.25	0.5	0.5	0.5	0.082	0.5	0.75	0.082	0.75	0.75	0.75
A14	0.082	0.082	0.25	0.25	0.75	0.5	0.082	0.082	0.25	0.25	0.082	0.75	0.5	0.082	0.75	0.75
A15	0.25	0.082	0.5	0.5	0.5	0.5	0.5	0.082	0.082	0.25	0.082	0.75	0.25	0.75	0.082	0.25
A16	0.5	0.25	0.25	0.75	0.75	0.5	0.082	0.75	0.75	0.082	0.25	0.75	0.75	0.75	0.5	0.082

Table 5. The normalized direct-relation matrix X—the TBL's perspective ($\times 10^{-2}$).

Criteria	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
A1	0.8	2.3	2.3	0.7	0.7	4.7	0.8	7	7	0.8	0.8	0.8	2.3	0.8	2.3	7
A2	4.7	0.8	8.5	4.7	4.7	7	0.8	4.7	4.7	0.8	0.8	2.3	7	8	7	4.7
A3	2.3	7	0.8	2.3	2.3	2.3	7	4.7	4.7	0.8	4.7	4.7	7	4.7	7	4.7
A4	4.7	4.7	2.3	8	7	7	4.7	4.7	2.3	7	7	4.7	7	0.2	2.3	7
A5	7	4.7	4.7	8.5	0.8	7	8.5	8.5	7	7	8.5	4.7	4.7	7	4.7	7
A6	4.7	2.3	2.3	7	7	0.8	7	2.3	7	7	2.3	2.3	4.7	4.7	2.3	2.3
A7	0.8	0.8	2.3	4.7	4.7	7	0.8	2.3	7	2.3	0.8	0.8	2.3	0.8	2.3	0.8
A8	2.3	2.3	2.3	7	2.3	7	7	0.8	4.7	7	4.7	2.3	7	0.8	0.8	4.7
A9	2.3	2.3	4.7	7	7	7	4.7	2.3	8.5	0.8	4.7	2.3	2.3	7	0.8	2.3
A10	0.8	0.8	0.8	4.7	2.3	7	4.7	7	0.8	0.8	7	4.7	0.8	7	7	0.8
A11	0.8	0.8	2.3	4.7	7	7	0.8	8.5	7	7	0.8	7	4.7	0.8	0.8	7
A12	0.8	2.3	7	7	8.5	7	0.8	7	7	2.3	4.7	0.8	8.5	4.7	2.3	8.5

Table 6. The total relation matrix M—the TBL's perspective ($\times 10^{-2}$).

Criteria	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
A1	6.2	6.7	8.2	16.3	15.9	13.8	7.7	14.5	15.1	6.7	7.3	8.3	10.3	7.5	8.1	14.6
A2	10.5	5.9	15.3	15.3	15.1	16.9	8.8	13.2	14.0	7.2	8.0	11.2	15.9	8.8	13.9	13.6
A3	8.0	11.4	8.1	13.1	13.2	13.0	14.1	13.2	14.0	7.1	14.4	13.6	16.0	12.3	13.9	13.7
A4	11.3	9.9	10.2	13.4	19.0	19.0	13.3	15.3	13.5	14.5	15.2	14.6	17.1	9.3	10.4	17.2
A5	15.2	11.5	14.5	24.2	16.8	22.8	19.4	21.5	20.9	16.8	18.8	17.6	18.0	17.9	14.8	20.2
A6	10.3	7.1	9.1	17.5	17.4	11.6	14.6	11.3	16.0	13.4	9.8	11.0	13.3	12.3	9.4	11.3
A7	4.4	3.7	6.3	11.0	10.9	13.1	15.8	7.5	10.1	6.6	5.3	5.9	7.6	5.5	6.3	6.0
A8	8.1	7.1	9.1	17.7	13.2	17.6	14.6	9.8	17.7	13.5	12.1	11.0	15.7	8.7	7.7	13.4
A9	7.7	6.8	10.7	16.4	16.6	16.4	11.6	10.4	9.5	7.2	11.2	10.3	10.7	13.6	7.2	10.8
A10	5.4	4.5	6.4	13.5	11.4	15.9	11.0	14.0	8.8	7.0	12.7	12.2	8.6	13.0	12.4	8.6
A11	7.1	6.0	9.6	16.5	18.2	18.3	9.4	18.1	17.2	14.2	9.1	16.1	14.4	9.5	8.1	16.5
A12	8.5	8.7	15.6	20.5	21.8	20.0	10.9	18.2	19.0	10.9	14.1	12.4	2.1	14.7	11.3	20.0
A13	9.3	8.3	15.3	19.7	19.8	15.2	13.6	15.3	16.0	8.7	13.3	19.3	12.2	16.2	15.2	18.1
A14	6.0	4.9	8.5	11.8	16.1	13.5	7.4	8.6	10.5	7.9	7.1	16.3	12.6	8.1	12.9	14.8
A15	6.9	4.8	10.2	13.1	13.4	13.1	10.6	8.0	8.5	7.6	6.7	15.5	9.9	13.1	6.6	10.0
A16	13.7	8.1	10.8	19.9	19.9	17.2	9.9	17.4	18.3	8.8	11.1	18.9	17.9	16.1	12.8	12.3

Table 7. The values of R, C, (R + C), (R − C)—the TBL's perspective.

Criteria	R	C	R + C	R − C
A1	1.672	1.386	3.058	0.286
A2	1.936	1.154	3.090	0.782
A3	1.991	1.679	3.670	0.312
A4	2.232	2.599	4.831	−0.367
A5	2.909	2.587	5.496	0.322
A6	1.954	2.574	4.528	−0.620
A7	1.260	1.927	3.187	−0.667
A8	1.970	2.163	4.133	−0.193
A9	1.771	2.291	4.062	−0.520
A10	1.654	1.581	3.235	0.073
A11	2.083	1.762	3.845	0.321
A12	2.287	2.142	4.429	0.145
A13	2.355	2.023	4.378	0.332
A14	1.670	1.866	3.536	−0.196
A15	1.580	1.710	3.290	−0.130
A16	2.331	2.211	4.542	0.120

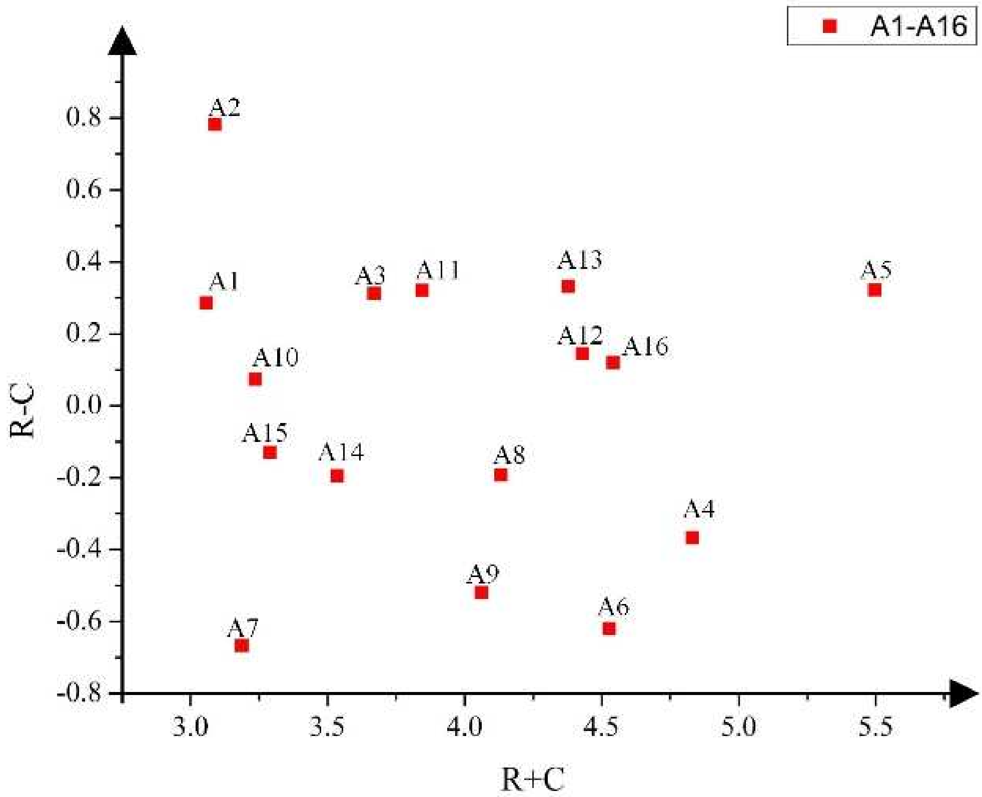

Figure 3. Cause–effect relation diagram.

The final results of our research are shown in Table 7 and Figure 3. According to Equations (7) and (8), we can know the elements in the cause group and the result group. The cause group includes drivers A1, A2, A3, A5, A10, A11, A12, A13, A16, and the effect group includes drivers A4, A6, A7, A8, A9, A14, A15. The results show that government regulations (A2), competitive advantage (A11), green supply chain pressure (A13) and green technology innovation (A5), incentive measures (A1) and standards (A3) are the six key drivers that promote the effective implementation of CER in the automotive industry. The most important driver is government regulations (A2). Half of the six key drivers are policy drivers. The fact is also true. The effective implementation of CER requires the government to formulate and supervise the implementation of environmental protection regulations and standards. Green supply chain pressure (A13), green technology innovation (A5) and competitive advantage (A11) rank second, third, and fourth among all important drivers. From the perspective of the effect group, it can be seen that media pressure (A15) ranks first in the effect group, and employee demand (A7) ranks last in the effect group.

As far as we know, there is no relevant analysis on the research directions involved in this paper, so it is impossible to give appropriate horizontal comparison results, but we have found similar experimental results in papermaking enterprises, industrial enterprises and the fashion industry. Among them, papermaking enterprises provide internal and external drivers for the company's green and sustainable development [56]. External drivers include government pressure, social pressure and economic pressure. Internal drivers include management, employees, corporate culture, the size of the company, and the financial situation. Experimental results show that economic pressure is the first driving force, and internal management and employee environmental awareness are the second driving force. The external factors for the green development of industrial enterprises [57] include policy and institutional environment, market environment and public supervision, and internal factors include the tangible and intangible resources of the enterprise. In the fashion industry [58], there are similar results. The driving factors of the sustainable fashion industry are attributed to internal driving factors (entrepreneurial direction and founder culture, integration between different companies, innovation) and external driving factors (regulation, consumer awareness, competitiveness). Obviously, these have confirmed that government supervision, policies and regulations are the most important external driving factors for the manufacturing industry to fulfill its environmental responsibilities and implement environmental behaviors, which is basically consistent with the research results of this paper.

The verification is based on feedback from experts in the CAMI and references to relevant existing literature. After verification, our research results will be submitted to K Company.

6. Discussion

According to the research results, we drew a histogram of the key drivers and sorted the key drivers according to formula (9), as shown in Figure 4 and Table 8. It can be seen from Figure 4 and Table 8 that government regulations (A2) is the most important driver, ranking first. Only when the government and regulatory agencies jointly promote the automobile manufacturing industry to perform environmental responsibilities in strict accordance with regulations and standards can the company's environmental and economic interests achieve balanced development. In addition, green supply chain pressure (A13), green technology innovation (A5), and competitive advantage (A11) rank second, third, and fourth. These are the key drivers for the company to implement CER. These identified key drivers are interrelated: the implementation of government regulations (A2) is conducive to the improvement of enterprises' green technology innovation (A5), and promotes the improvement of enterprises' competitive advantage (A11), and the green supply chain pressure (A13) can also promote enterprises to comply with the laws and regulations of higher-level government departments, and improve their compliance and compliance. The other five drivers, including standards (A3), incentives (A1), consumers demand (A12), market trend (A16), and company image (A10), are also important for implementation of CER, and they all have different degrees of each other. The following research will conduct a correlation analysis of the importance of all these key drivers.

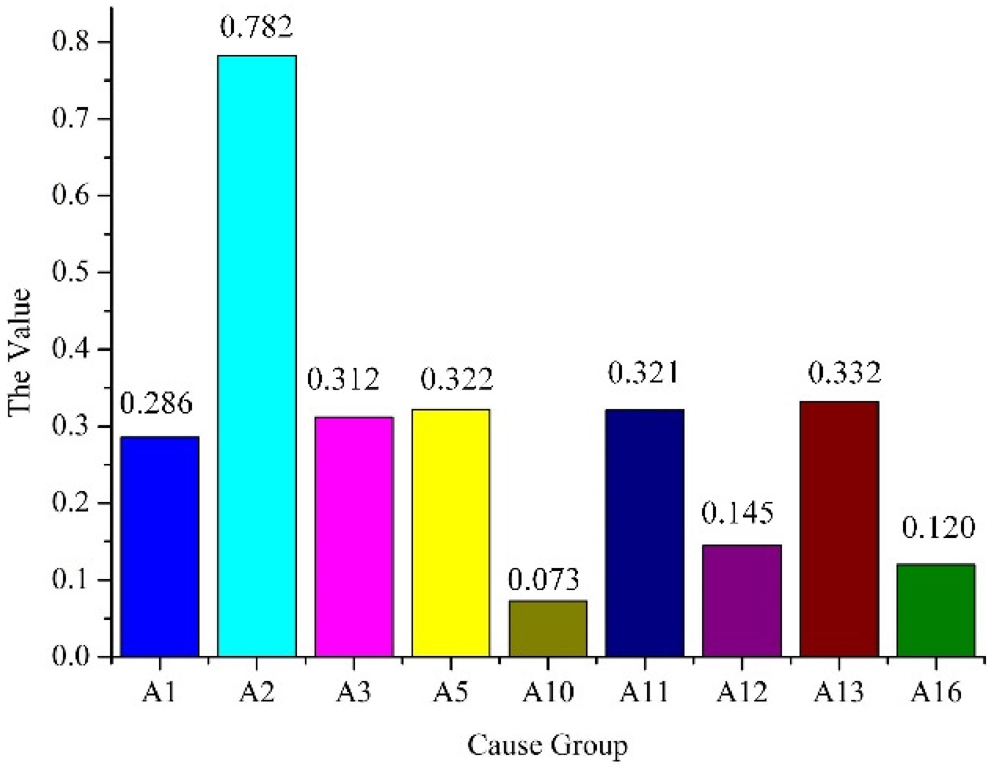

Figure 4. Causes group histogram.

Table 8. The sequencing of the key drivers.

Key Drivers	R − C	Rg	Ranking
Incentives (A1)	0.286	36.57	6
Government regulations (A2)	0.782	100.00	1
Standards (A3)	0.312	39.89	5
Green technology innovation (A5)	0.322	41.18	3
Company image (A10)	0.073	9.34	9
Competitive advantage (A11)	0.321	41.04	4
Consumers demand (A12)	0.145	18.54	7
Green supply chain pressure (A13)	0.332	42.46	2
Market trend (A16)	0.120	15.35	8

In this study, we discussed the conclusions of the study and the importance of implementing CER, and drew some management implications including:

First of all, in order to accelerate the effective implementation of CER in CAMI, the government needs to improve the implementation and supervision of environmental protection policies and regulations, and increase the penalties for violations of environmental protection regulations. At the same time, it also encourages and praises companies that effectively implement CER and promote environmental improvements to promote its excellent practices. Second, the pressure of the upstream and downstream supply chains of automobile manufacturers also provides a strong impetus to promote the implementation of CER, because downstream consumers are more inclined to choose environmentally friendly products and are willing to pay for environmental protection. Upstream suppliers need to promote the design and development of more environmentally friendly and green products in the automobile manufacturing industry, thereby promoting the green innovation of upstream suppliers. Third, the green technological innovation of CAMI is also a very key driver, which is fundamentally the way for the enterprise to improve environmental performance and economic efficiency. Innovation is the source of all development; enterprises need to improve the construction of green technology innovation talent teams and increase the investment of green innovation costs. Fourth, the establishment of high-level environmental protection standards by the government and local governments is also a driving factor for enterprises to effectively implement CER. Finally, corporate incentives, public awareness of environmental protection, market trends, and corporate image can all have a positive impact on the implementation of CER by companies.

7. Conclusions and Future Work

Based on the perspective of TBL, and through the fuzzy DEMATEL method, we identified six key drivers from 16 common drivers, including government regulations (A2), green supply chain pressure (A13), green technological innovation (A5), competitive advantage (A11), standards (A3), and incentive measures (A1). These six key drivers are critical to the implementation of CER in CAMI. The main measures include the following: automobile manufacturers should improve the level of green technology innovation, pay attention to the needs of the upstream and downstream supply chain, improve the level of standard implementation, pay attention to competitive advantages, and formulate internal incentive mechanisms on the premise of meeting the requirements of government regulations. Only by continuing to meet the needs of all relevant parties can the company's environmental and economic benefits be comprehensively improved, and the company's green and sustainable development can be promoted. Through this research, K company can better understand the importance of CER practice to its own green development and sustainable development, and it is feasible to realize the coordinated development of economy, environment and society.

The work of this paper provides a valuable reference for the research and practice of CER in CAMI, finds the key drivers for the implementation of CER, and gives some management enlightenment. It is worth noting that this study still has certain limitations.

First of all, in the process of identifying and evaluating drivers, the number of questionnaires is relatively limited. Secondly, due to the limited amount of data, the proposed method cannot be further and extensively verified. The verified situation of a small and medium-sized automobile manufacturing industry cannot fully represent the situation of China's entire automobile manufacturing industry. The research conclusions cannot be widely applied to all automobile manufacturing industries, automobile sales companies, etc. These may constitute the basic elements of future research.

Therefore, the future research direction is from the perspective of the impact of the development of artificial intelligence and smart manufacturing technology on CAMI. The research perspective of CAMI's implementation of CER can also be shifted from the perspective of TBL to other perspectives, such as technology and multiple stakeholders. Regarding model construction and selection of multicriteria decision-making methods, the existing fuzzy decision-making can be extended to more advanced intelligent decision-making models and decision-making algorithms. In addition, it may be very interesting to study the relationship between CAMI's implementation of CER on corporate sustainable development and green development, and how to improve the company's image and increase profitability.

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References

1. Zhao, F.W.; Zhao, B.J. Research on the Development Strategies of New Energy Automotive Industry Based on Car Charging Stations. *Appl. Mech. Mater.* **2015**, *740*, 985–988. [CrossRef]
2. He, M.; Chen, J. Sustainable Development and Corporate Environmental Responsibility: Evidence from Chinese Corporations. *J. Agric. Environ. Ethic* **2009**, *22*, 323–339. [CrossRef]
3. Li, P.C.; Zhang, H.M. Application Situation and Development Strategies of Green Manufacturing in China's Automobile Industry. *Adv. Mater. Res.* **2014**, *1049–1050*, 945–948. [CrossRef]
4. Severo, E.A.; de Guimarães, J.C.F.; Dorion, E.C.H. Cleaner production, social responsibility and eco-innovation: Generations' perception for a sustainable future. *J. Clean. Prod.* **2018**, *186*, 91–103. [CrossRef]
5. Jiang, Z.; Jiang, Y.; Wang, Y.; Zhang, H.; Cao, H.; Tian, G. A hybrid approach of rough set and case-based reasoning to remanufacturing process planning. *J. Intell. Manuf.* **2019**, *30*, 19–32. [CrossRef]
6. Ding, Z.; Jiang, Z.; Zhang, H.; Cai, W.; Liu, Y. An integrated decision-making method for selecting machine tool guideways considering remanufacturability. *Int. J. Comput. Integr. Manuf.* **2018**, *33*, 686–700. [CrossRef]
7. Elkington, J. Accounting for The Triple Bottom Line. *Meas. Bus. Excel.* **1998**, *2*, 18–22. [CrossRef]
8. Mazurkiewicz, P. *Corporate Environmental Responsibility: Is a Common CSR Framework Possible*; World Bank: Washington, DC, USA, 2004; pp. 1–18.
9. González-Rodríguez, M.R.; Díaz-Fernández, M.C.; Biagio, S. The perception of socially and environmentally responsible practices based on values and cultural environment from a customer perspective. *J. Clean. Prod.* **2019**, *216*, 88–98. [CrossRef]
10. Nawaz, W.; Linke, P.; Koç, M. Safety and sustainability nexus: A review and appraisal. *J. Clean. Prod.* **2019**, *216*, 74–87. [CrossRef]
11. Gunningham, N. Shaping corporate environmental performance: A review. *Environ. Policy Gov.* **2009**, *19*, 215–231. [CrossRef]
12. Wang, H. Systematic analysis of corporate environmental responsibility: Elements, structure, function, and principles. *Chin. J. Popul. Resour. Environ.* **2016**, *14*, 96–104. [CrossRef]
13. Cai, W.; Liu, C.; Lai, K.-H.; Li, L.; Cunha, J.; Hu, L. Energy performance certification in mechanical manufacturing industry: A review and analysis. *Energy Convers. Manag.* **2019**, *186*, 415–432. [CrossRef]

14. Fujii, H.; Managi, S. Trends in corporate environmental management studies and databases. *Environ. Econ. Policy Stud.* **2016**, *18*, 265–272. [CrossRef]
15. Liu, Y.; Xi, B.; Wang, G. The impact of corporate environmental responsibility on financial performance—Based on Chinese listed companies. *Environ. Sci. Pollut. Res.* **2021**, *28*, 7840–7853. [CrossRef] [PubMed]
16. Shabbir, M.S.; Wisdom, O. The relationship between corporate social responsibility, environmental investments and financial performance: Evidence from manufacturing companies. *Environ. Sci. Pollut. Res.* **2020**, *27*, 39946–39957. [CrossRef] [PubMed]
17. Kennard, A. The Enemy of My Enemy: When Firms Support Climate Change Regulation. *Int. Organ.* **2020**, *74*, 187–221. [CrossRef]
18. Gong, J.Z.Y.; Wang, G. *An Investigation into Triple Bottom Line Assessment of Eco-Friendly Office Supplies: File Folders*; University of British Columbia: Vancouver, BC, Canada, 2014.
19. Casey, E.; Beaini, S.; Pabi, S.; Zammit, K.; Amarnath, A. The Triple Bottom Line for Efficiency: Integrating Systems Within Water and Energy Networks. *IEEE Power Energy Mag.* **2017**, *15*, 34–42. [CrossRef]
20. Fairley, S.; Tyler, B.D.; Kellett, P.; D'Elia, K. The Formula One Australian Grand Prix: Exploring the triple bottom line. *Sport Manag. Rev.* **2011**, *14*, 141–152. [CrossRef]
21. Wise, N. Outlining triple bottom line contexts in urban tourism regeneration. *Cities* **2016**, *53*, 30–34. [CrossRef]
22. Depken, D.; Zeman, C. Small business challenges and the triple bottom line, TBL: Needs assessment in a Midwest State, U.S.A. *Technol. Forecast. Soc. Chang.* **2018**, *135*, 44–50. [CrossRef]
23. Tseng, M.-L.; Wu, K.-J.; Ma, L.; Kuo, T.C.; Sai, F. A hierarchical framework for assessing corporate sustainability performance using a hybrid fuzzy synthetic method-DEMATEL. *Technol. Forecast. Soc. Chang.* **2019**, *144*, 524–533. [CrossRef]
24. Ahi, P.; Searcy, C. A stochastic approach for sustainability analysis under the green economics paradigm. *Stoch. Environ. Res. Risk Assess.* **2013**, *28*, 1743–1753. [CrossRef]
25. Wu, K.-J.; Liao, C.-J.; Tseng, M.; Chiu, K.K.-S. Multi-Attribute Approach to Sustainable Supply Chain Management Under Un-Certainty. *Ind. Manag. Data Syst.* **2016**, *116*, 777–800. [CrossRef]
26. Esquer-Peralta, J.; Velazquez, L.; Munguia, N. Perceptions of core elements for sustainability management systems (SMS). *Manag. Decis.* **2008**, *46*, 1027–1038. [CrossRef]
27. Palvia, P.; Baqir, N.; Nemati, H. ICT for socio-economic development: A citizens' perspective. *Inf. Manag.* **2018**, *55*, 160–176. [CrossRef]
28. Tseng, M.-L.; Chiu, A.S.; Liang, D. Sustainable consumption and production in business decision-making models. *Resour. Conserv. Recycl.* **2018**, *128*, 118–121. [CrossRef]
29. Bergenwall, A.L.; Chen, C.; White, R.E. TPS's process design in American automotive plants and its effects on the triple bottom line and sustainability. *Int. J. Prod. Econ.* **2012**, *140*, 374–384. [CrossRef]
30. Gimenez, C.; Sierra, V.; Rodon, J. Sustainable operations: Their impact on the triple bottom line. *Int. J. Prod. Econ.* **2012**, *140*, 149–159. [CrossRef]
31. Neri, A.; Cagno, E.; Lepri, M.; Trianni, A. A triple bottom line balanced set of key performance indicators to measure the sustainability performance of industrial supply chains. *Sustain. Prod. Consum.* **2021**, *26*, 648–691. [CrossRef]
32. Agrawal, S.; Singh, R.K. Analyzing disposition decisions for sustainable reverse logistics: Triple Bottom Line approach. *Resour. Conserv. Recycl.* **2019**, *150*, 104448. [CrossRef]
33. Hussain, N.; Rigoni, U.; Orij, R.P. Corporate Governance and Sustainability Performance: Analysis of Triple Bottom Line Performance. *J. Bus. Ethics* **2018**, *149*, 411–432. [CrossRef]
34. Chen, Y.; Lawell, C.-Y.C.L.; Muehlegger, E.J.; Wilen, J.E. Modeling Supply and Demand in the Chinese Automobile Industry. In Proceedings of the 2017 Annual Meeting, Chicago, IL, USA, 30 July–1 August 2017.
35. Azevedo, S.; Barros, M. The application of the triple bottom line approach to sustainability assessment: The case study of the UK automotive supply chain. *J. Ind. Eng. Manag.* **2017**, *10*, 286–322. [CrossRef]
36. Kumar, D.; Rahman, Z.; Chan, F.T.S. A fuzzy AHP and fuzzy multi-objective linear programming model for order allocation in a sustainable supply chain: A case study. *Int. J. Comput. Integr. Manuf.* **2017**, *30*, 535–551. [CrossRef]
37. Mathivathanan, D.; Kannan, D.; Haq, A.N. Sustainable supply chain management practices in Indian automotive industry: A multi-stakeholder view. *Resour. Conserv. Recycl.* **2018**, *128*, 284–305. [CrossRef]
38. Wang, H. Factor analysis of corporate environmental responsibility. *Environ. Dev. Sustain.* **2009**, *12*, 481–490. [CrossRef]
39. Dummett, K. Drivers for Corporate Environmental Responsibility (CER). *Environ. Dev. Sustain.* **2006**, *8*, 375–389. [CrossRef]
40. Kehbila, A.G.; Ertel, J.; Brent, A.C. Strategic corporate environmental management within the South African automotive industry: Motivations, benefits, hurdles. *Corp. Soc. Responsib. Environ. Manag.* **2009**, *16*, 310–323. [CrossRef]
41. Cai, W.; Lai, K.-H.; Liu, C.; Wei, F.; Ma, M.; Jia, S.; Jiang, Z.; Lv, L. Promoting sustainability of manufacturing industry through the lean energy-saving and emission-reduction strategy. *Sci. Total Environ.* **2019**, *665*, 23–32. [CrossRef]
42. Nunes, B.; Bennett, D. Green operations initiatives in the automotive industry: An environmental reports analysis and benchmarking study. *Benchmarking: Int. J.* **2010**, *17*, 396–420. [CrossRef]
43. Yucheng, C.; You, J.; Wang, R.; Shi, Y. Designing a mixed evaluating system for green manufacturing of automotive industry. *Probl. Ekorozwoju* **2016**, *11*, 73–86.
44. Babiak, K.; Trendafilova, S. CSR and environmental responsibility: Motives and pressures to adopt green management practices. *Corp. Soc. Responsib. Environ. Manag.* **2011**, *18*, 11–24. [CrossRef]

45. Lee, J.W.; Kim, Y.M. Antecedents of Adopting Corporate Environmental Responsibility and Green Practices. *J. Bus. Ethics* **2016**, *148*, 397–409. [CrossRef]
46. Goli, Y.S.; Ye, J.; Ye, Y.; Kalgora, B. Impact of Ecological Related Innovations Enhancing the Efficiency of Corporate Environmental Responsibility. *Am. J. Ind. Bus. Manag.* **2020**, *10*, 191–217. [CrossRef]
47. Chen, Y.-S. The Drivers of Green Brand Equity: Green Brand Image, Green Satisfaction, and Green Trust. *J. Bus. Ethics* **2009**, *93*, 307–319. [CrossRef]
48. Ho, C.-W. Does Practicing CSR Makes Consumers Like Your Shop More? Consumer-Retailer Love Mediates CSR and Behavioral Intentions. *Int. J. Environ. Res. Public Heal.* **2017**, *14*, 1558. [CrossRef] [PubMed]
49. Jahanshahi, A.A.; Brem, A. Antecedents of Corporate Environmental Commitments: The Role of Customers. *Int. J. Environ. Res. Public Heal.* **2018**, *15*, 1191. [CrossRef]
50. Sevinç, A.; Eren, T. Determination of KOSGEB Support Models for Small- and Medium-Scale Enterprises by Means of Data Envelopment Analysis and Multi-Criteria Decision Making Methods. *Process* **2019**, *7*, 130. [CrossRef]
51. Wang, H.; Jiang, Z.; Zhang, H.; Wang, Y.; Yang, Y.; Li, Y. An integrated MCDM approach considering demands-matching for reverse logistics. *J. Clean. Prod.* **2019**, *208*, 199–210. [CrossRef]
52. Hamdia, K.M.; Arafa, M.; Alqedra, M. Structural damage assessment criteria for reinforced concrete buildings by using a Fuzzy Analytic Hierarchy process. *Undergr. Space* **2018**, *3*, 243–249. [CrossRef]
53. Wu, W.; Lan, L.W.; Lee, Y. Factors hindering acceptance of using cloud services in university: A case study. *Electron. Libr.* **2013**, *31*, 84–98. [CrossRef]
54. Zadeh, L.A. *Fuzzy Sets, Fuzzy Logic, and Fuzzy Systems: Selected Papers by Lotfi A Zadeh*; State University of New York at Binghamton: New York, NY, USA, 1996; pp. 394–432. [CrossRef]
55. Lin, R.-J. Using fuzzy DEMATEL to evaluate the green supply chain management practices. *J. Clean. Prod.* **2013**, *40*, 32–39. [CrossRef]
56. He, Z.-X.; Shen, W.-X.; Li, Q.-B.; Xu, S.-C.; Zhao, B.; Long, R.-Y.; Chen, H. Investigating external and internal pressures on corporate environmental behavior in papermaking enterprises of China. *J. Clean. Prod.* **2018**, *172*, 1193–1211. [CrossRef]
57. Li, X.; Du, J.; Long, H. Green Development Behavior and Performance of Industrial Enterprises Based on Grounded Theory Study: Evidence from China. *Sustainability* **2019**, *11*, 4133. [CrossRef]
58. Dicuonzo, G.; Galeone, G.; Ranaldo, S.; Turco, M. The Key Drivers of Born-Sustainable Businesses: Evidence from the Italian Fashion Industry. *Sustainability* **2020**, *12*, 10237. [CrossRef]